Message

From: Dan Johnson [DanJohnson@florencecopper.com]
Sent: 9/17/2018 3:58:37 PM
To: Rumrill, Nancy [Rumrill.Nancy@epa.gov]
Subject: RE: Clarification of Florence Copper's Formation Testing
Attachments: ATT00001.txt

Good Morning Nancy,

Core holes drilled within the footprint of the PTF well field show that the Sidewinder fault transects the wellfield area at depth. However no hydraulic testing was conducted in the core holes that could be used to characterize the flow properties of the Sidewinder fault. The groundwater model was constructed after the core holes had been drilled but before the PTF wells had been drilled, constructed and tested. The Sidewinder fault was rendered in the groundwater model to allow for the assignment of specific flow parameters to model cells representing the fault.

The Sidewinder fault was assigned higher hydraulic conductivity than the surrounding cells to simulate a theoretical worst case condition in which the fault acted as a preferential groundwater flow pathway. The USEPA consultant (Jim Walker) requested that model be run with the highest porosity and hydraulic conductivity values observed during aquifer test results produced by consultants working for BHP in the 1990's. As described in Section A.3.3 of Attachment A of the UIC application, the simulations also included other extreme model settings such as continued injection without recovery for protracted periods of time to demonstrate worst case conditions. The hydraulic conductivity values assigned to the fault reflected some of the highest values observed at other areas of the Florence Copper property. The aquifer test results were submitted with groundwater model report in the UIC application materials.

The resulting simulations reflect a worst case scenario wherein the Sidewinder fault acts a preferential flow pathway, and represents a conservative assessment of the distance that fluid may flow if such a pathway existed. These simulations were completed prior to drilling, construction and testing of the PTF wells and consequently, spinner flow meter data were not available to validate assumptions regarding hydraulic properties of the Sidewinder fault.

The fact that the spinner flow meter data in the lower portions of the wells reflects relatively lower flow indicates that the Sidewinder fault is not a preferential flow pathway, and that the model therefore conservatively overestimates the effect of a potential fluid excursion at depth.

If you have any further questions, please feel free to contact me.

Best Regards,

Dan Johnson VP | General Manager

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From: Rumrill, Nancy [mailto:Rumrill.Nancy@epa.gov]
Sent: September-13-18 10:53 AM
To: Dan Johnson
Subject: Clarification of Florence Copper's Formation Testing

Hi Dan,
Per my phone call with you, our contractor had one comment based on review of the Formation Testing Report that needs your clarification. That is, the spinner flow test shows lower permeability in the lower portion of the oxide zone, with the lowest flow at the bottom portion tested. The modeling in the UIC application, Attachment A (Section A.3.3) , however shows model runs where the lower layers of the model domain are hydrologically controlled by the Sidewinder fault zone and associated high secondary permeability. Would you clarify this for me?

Thanks, Nancy

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